GENERAL REMARKS.

Forestry in Germany is truly a science, and differs very widely from anything I have seen called by the same name either in India or England. I do not advance the theory that the German system is perfect or applicable to all States or circumstances, and still less that we in England do not grow as fine trees, or do not know how to plant and rear young trees for timber. If any have doubts on these points I would point to the Swinley woods under the charge of Mr. Menzies, and portions of the New Forest under Mr. Cumberbatch, which may challenge comparison with any oak plantations of the same age on the continent; but I do think, and am sure that any who have studied the subject and made themselves thoroughly acquainted with it by personal observation, will agree with me, that compared with most of the German States we are behindhand as regards the systematic and scientific management of forests on a large scale, and as a part of political economy to which it is incumbent on a government to attend. In fact, looked at in this light, I venture to affirm that we are as far behind Germany in the knowledge and application of scientific forestry as we are in advance with regard to agricultural pursuits. Advanced state of forestry in Germany.

I grant that for England State forests are not a necessity (although I am not sure that we may not some day regret their absence or limited extent), for she can command the market for timber, burns comparatively little firewood, has a very small area, almost every acre of which is of great value either for building or agricultural purposes; and from the many large estates which exist throughout the country, and the naturally luxuriant growth consequent on a moist climate is, on the whole, well wooded, although for the most part the woods are grown for luxury (*e.g.*, enhancing the beauty of the landscape, affording cover for game), and not merely regarded as timber-producing areas. Large State forests not a necessity in England.

Again, private enterprise and intelligence effects a great deal more with us than on the continent, where Governments are still often looked to to originate and take the lead; and we often drift, so to speak, into the right channel without exactly knowing how or why.

I would therefore merely venture to remark as to Government or State forest management in England that where it does exist no efforts should be spared to make it as perfect and lucrative as possible, and I am convinced that this can

only be done by the introduction of a thorough system of rotation and periods based upon carefully prepared measurements, valuations, and working plans, forming a definite plan of operations with certain objects in view, and not mere desultory planting liable to interruption at any time by a change in the Government or commissioner of woods, or on the *ex parte* statements of the commoners, whose rights should be definitely settled in one way or another.

Necessity of State forests on a large scale in India.

In India, however, the position is quite different. Not only is there a large and ever increasing local demand to meet the wants of a population of upwards of 200 millions in the shape of building material and firewood, a demand which can never be met from abroad, but we have to consider such questions as climate, rainfall affecting the irrigation and cultivation of thousands of acres, and supply of wood fuel to the railways, any curtailment or enhancement of price in which means greatly increased working expenses and consequent loss to Government.

In India the people still look to Government for everything, and will do so for many a year to come, and there is little or none of that peculiar form of private enterprise which will plant and conserve forests on scientific principles, introduce better methods of felling and converting timber, and look into and provide for the future and its wants.

All this devolves on the Government, and particularly so, I consider, with regard to forests, which must be regarded and managed as a whole, and with regard to the general good, and cannot be left to the individual caprice of private individuals or even communities; for trees do not grow in a few months or a year, like rice or corn; nor can one portion of a forest be managed like a field without reference to the surrounding tract.

Most of the larger forest tracts are, besides, in the hands of the State as assessed or unassessed waste, and will if properly administered form a great and ever increasing source of strength to the rulers of the country.

The German system modified according to circumstances suitable for India.

The Government having granted by the gradual formation of a distinct forest service, the necessity of establishing a system of forest conservancy, and administering and working the forests by degrees on more well-defined principles and to the best advantage, the question naturally presents itself, where are we to look for a model or precedent on which to work? and the reply appears ready; to Germany, where forestry and particularly the management of forests by the State has been carried on for hundreds of years. Not the mere planting of a few hundred acres here, or reserving a

few thousand acres there, but a general system of forest management, commencing by a careful survey, stock taking, definition and commutation of all rights and servitudes, careful experiments in the rate of growth, the best soil for each description of tree; in fact, in every branch of the subject, and resulting in what we find to-day, in Hanover, for instance, hundreds of thousands of acres mapped, divided into periods and blocks, and worked to the best advantage both with regard to present and future, and the annual yield of which now and for many years to come is known and fixed to within a few hundred cubic feet.

The great difference in climate and local conditions between India and Germany would doubtless necessitate important modifications and deviations from the plan pursued in the latter country at each stage in the development of our forest system, but I can see no reason why the broad principles of organisation and forest management should not be applied with success to our Indian forests not hastily, or without careful preliminary experiment, but very gradually, feeling our way both as regards the best mode of treatment for the several classes of forest, and the wishes and interests of the people and State.

Definition of State and communal forests; their demarcation, survey, and settlement absolutely necessary.

I would commence by the definition of what constitute State and communal forests, which should then be demarcated and surveyed, mapped, and valued, divided into blocks and complexes, and working plans prepared for their management.

Since I have studied the matter in Germany this appears to me the very foundation and essence of good forest management, as by these steps we arrive at a definite plan and fixed idea of the objects in view, and how best to arrive at them, so that the management ceases to be desultory and personal, varying widely according to the views of the forest officer in charge, the district collector, or even of the subordinates of the revenue and forest departments. One very important matter to be settled, one which has, in fact, I may say, formed the stumbling block hitherto in Madras in all our attempts at dividing the forests betwixt the State, the communities, and individuals, is that of rights and servitudes; and I think that what I have seen and learnt on this subject alone during my tour in Germany repays the trouble and expense, even had I learnt nothing else. I advocate the speedy definition, registration, and, wherever possible, buying up or commutation of all such rights; and I think an Act and the appointment of a joint commission are necessary to enable us to do it; but I think I take a much broader and

Servitudes to be liberally construed, but defined and, if possible, commuted.

more liberal view of what constitute rights and privileges than I held when I left India, and since I have seen and read that the same sort of thing has been universal in Europe, and that it is only now in some States that a settlement is being arrived at, and that the people are becoming alive to the fact that it is to their own interest to commute privileges often vague and ill defined for a money payment, a fixed quantity of wood per annum to be handed over to them by the forest department, or the right of pasture within a limited area. I think we cannot well take too broad a view in settling and defining the servitudes, even when the right is doubtful, but I am convinced that they should be defined, and as much as possible cancelled by liberal money compensation or annual allotment of timber or firewood. With regard to pasture, I would hope to be able to throw open all the forests, as they grew out of danger of damage from legitimate grazing, to the public at large, with certain well-considered restrictions and not easily evaded punishments in the event of mischief being done by the owners or herdsmen, and, if thought advisable, on payment of some small annual fee; but I deprecate the extension of any special rights to particular villages and persons, and consider it expedient to commute or endeavour to commute them where they already exist. No more analogous position to that which we are now in, and no better guide for settling matters justly and to the best advantage of all parties concerned, can be found than in the history of the progress of State forest administration and legislation in many of the German States.

Absence of all enclosing in German forests and plantations.

Nothing struck me more wherever I went than the entire absence of fencing and enclosures, considered so imperatively necessary in our Indian and English forest management. Bunches of dry grass tied to the branches of the outer trees suffice to denote forbidden ground, and to deter people from entering or driving in their cattle. And I am informed that trespass in such places is very rare and generally inadvertent. There is, of course, a staff of watchers, and punishment follows detection, but considering the extensive area and consequent comparatively small chance of detection, it must be something else which exercises a deterrent effect, and I am inclined to look for it in the knowledge that the whole question has been thoroughly inquired into and settled, and that Government or its forest officers will not exclude man or beast unless absolutely necessary for the good of the forests, of which all classes have learnt to know and appreciate the value.

I do not think we have much to learn from the Germans with regard to the planting and rearing of young trees, but it is with regard to the best methods of managing groups of plantations or masses of forest that I consider we may with advantage take a leaf out of their book. Points on which the German system may serve as a model for India.

For instance, I would certainly introduce in a tentative manner, and at first on a very small scale, their system of rotation, clearing, and periods, and endeavour to bring forward a second crop before the first is off the ground, encourage the growth of the better descriptions, and keep down the less valuable, and to improve our "Plänter-betrieb," or selection of single trees to be felled, so as gradually to arrive at groups of trees of the same age, description, and class, and eventually at blocks worked in rotation, and containing always a sufficient stock or crop coming on to meet the requirements of future years.

To arrive at all this the most careful observations and experiments will have to be made as to the rate of growth and yield per acre of each description of forest, the conditions under which trees grow best and form the most timber, some requiring close and some open planting, some nurses and some not, some, like the oak, requiring a great deal of light, whilst others, like the beech, do well for many years in shade. All these points, and many more, demand attention, and till they are settled we shall be merely groping in the dark. In fact, I think it may be taken for granted that all we do in the way of forestry in the Madras Presidency during the present century at least, will, after all, be but experimentalising, which fact, however, need in no way delay the demarcation, survey, and settlement of the forests. These are, in fact, the first steps towards the initiation of systematic experiments, from the results of which valuable statistical data may be compiled for future guidance. Having said so much with regard to the chief points which have suggested themselves in connexion with forest administration, legislation, and management as applicable to India, and regarding which, I think, I learnt not a little during my tour, I proceed to refer to the establishments employed.

Nothing that I can say or write can convey too high an idea of the attainments and thorough knowledge of their work possessed by German forest officers of all grades. I confess that prior to and during the first few weeks of my visit I was inclined to class a great deal of German forestry as much theory and little practice, and perhaps mountains are sometimes made of molehills, and more is written than the subject demands or justifies, but this may be said with German forest officers and their attainments.

equal truth of every science or profession, and a very little time served to convince me that the practice of the German foresters was as good, if not better, than their theory, and that they were in fact perfect masters of their duties in all their details. An Oberförster, and even many of the Försters and overseers, can tell the name, local and botanical, of every tree, shrub, and plant, classify it, and state its uses; name and classify every beetle and insect in the forest, and know whether they are harmless or destructive to trees, in what shape they do damage, and what are the best known preventive measures; inform you of the nature of the soil, and to what period the formation belongs, what trees will grow best, and why. All this is known thoroughly, theoretically and practically.

Then as to the revier, the exact yield, rate of growth, and annual increase in value of each block is thoroughly known and can be put down at any moment in figures by the *Oberförster*, who can tell at the commencement of each year how much timber he is going to cut and sell and from what parts of the forest it is to come, how many acres have to be partially cleared for natural reproduction, planted, sown, thinned, or planted up.

The mere details of all this are left, as a rule, entirely to the subordinates, who thoroughly understand them.

The *Forstmeisters* in charge of divisions possess not only the theoretical and scientific knowledge acquired in the forest academy, and the practical experience gained whilst they were *Oberförsters* in charge of a revier, but the more extended knowledge and wider views from their larger field for observation and comparison of causes and results. They are thus qualified to decide most points, revise working plans, and supervise operations generally, whilst settling complaints and complications in connexion with the forest administration, advising the local head of the department, and compiling valuable reports and statistical information.

On the onerous duties of administration, legislation, and working of forestry in its most extended sense, which devolve on the higher grades, such as *Direktors, Ober-Forstmeisters, Oberland Forstmeisters,* and *Forst Räthe,* I need say nothing more than that all those with whom I had the honour of coming into contact appeared thoroughly at home, not only with their particular duties and branch, but with all the details of State forest administration and management. In a word, the longer I remained the more I saw and felt how little I knew of the subject compared with those I met occupying similar or analogous positions in the forest service; and if the highest wisdom with regard to forestry is to know

that you know nothing, I think I arrived very near it before my return to England.

I venture, however, to offer a few suggestions for the benefit of any of our forest officers who may be inclined to visit the German forests in future. Suggestions to forest officers visiting Germany.

I think there are very few, unless they are Germans by birth, or have constantly kept up their German studies, who would find that they could with advantage attend a course of lectures at one of the academies without more than two months' previous residence and study of the language and forest technicalities. I am therefore inclined, with all deference to Dr. Brandis' suggestions, almost to leave that out of consideration in sketching in what way time can be best utilized.

To those who do wish to go through such a course, and I am certain they will never repent it if they have sufficient time and knowledge of the language, I should say go to Hanover in September, and have at least one month in a revier before going to the academy. I do not think any revier could well be better suited for the purpose than Lauterberg. The winter term at Tharandt commences on the 15th October, and that at the Prussian academies (which I presume are also open to forest officers) and Aschaffenburg about the same time. Spend the winter at the academy, and by the end of April proceed for at least another six weeks to a revier, and apply what has been learnt and then devote another six weeks or two months to travelling through other forest districts and comparing the management and system in each. This course would occupy at least 10 months, and I do not imagine many forest officers on leave will be prepared to devote so much of their time to the subject. Long course, 10 to 12 months.

For those who could only devote a short time comparatively to the duty, or do not feel themselves sufficiently proficient in the language to benefit by a course of lectures, I would prescribe residence on a forest revier during six weeks, visiting other reviers in the same kingdom or province a fortnight, and travelling through the forests of other countries one month, making three months in all; and, if this time could be prolonged, I should advise a longer residence in the one revier. Dr. Brandis strongly recommended me to confine my attention for the most part to one province or portion of a province, and I cannot say I actually learnt much in the shape of practical forestry after I left Hanover, always excepting the felling and transport of timber in the Black Forest, which require to be seen to be understood and well repays a visit. I acquired much useful information in the other kingdoms, a great part of which, however, might be obtained from books. Short course, 3 to 6 months.

It is difficult to say at what season of the year it would be best to commence the short course, but I am inclined to say not earlier than April, as the climate in North Germany is very raw and severe, and few forest operations can be carried on when the ground is covered with snow, although I did miss a forest survey in Hanover by not arriving even sooner than I did (the middle of March), which I much regretted. It is impossible in so short a time to see everything, and if you are at Hanover in the proper season you will be at Rippoldsau when comparatively little is going on, and *vice versâ*.

Difficulties and discomfort to be expected at first.

Above all let no forest officer imagine he is starting on a mere pleasure trip, and will find everything *comfortable* and to his taste. He will find there is a great deal of roughing it in a shape which I think the most difficult to accommodate oneself to, strange and unpalatable food, want of cleanliness and comfort, and a perfect change in the mode of life, habits, and associates to what one has been accustomed to in England. I would particularly counsel the undertaking of no tours or expeditions until a little shaken down, at home with the language, and accustomed to the mode of life and style of food and lodging to be met with in a German village inn. I mention this as I spent much valuable time in making such tours at the outset, and derived little or no benefit.

Again, visitors must expect to be shown the same thing over and over again, which, although tiresome and seemingly useless, does good, I am convinced, in the end in firmly impressing things on one's memory.

I append tabular statements showing the extent under forest in proportion to total area, population, &c. in the principal German states, the figures in which are taken from *Bernhardt's Forststatistik Deutschlands*, to which work, *Die Forst Verwaltung Bayerns*, and Director Burckhardt's publications, I am indebted for much valuable information.

SPECIMEN OF HEADINGS INTO WHICH THE SKETCH OR PREFACE OF WORKING PLAN MAY BE DIVIDED (referred to at page 7).

PART FIRST.—Existing arrangements and circumstances of the forest.

1. Extent and situation. 2. Measurements, when and by whom taken, &c. 3. Boundaries. 4. Roads. 5. Local conditions, communal rights and privileges, and present state of the forest. 6. Yield and disposal of the produce.